

## WHAT IS CLAIMED IS:

1. An I.V. flush syringe assembly comprising:

5 a barrel having an inside surface defining a chamber for retaining fluid, an open proximal end and a distal end including a distal wall with an elongate tip extending distally therefrom having a passageway therethrough in fluid communication with said chamber;

10 a plunger including an elongate body portion having a proximal end, a distal end and a flexible stopper slidably positioned in fluid-tight engagement with said inside surface of said barrel for drawing fluid into and driving fluid out of said chamber by movement of said stopper relative to said barrel, said elongate body portion extending outwardly from said open proximal end of said barrel; and

15 anti-reflux means for holding said stopper in a partially deflected position when fluid has been delivered from said chamber and said stopper is in contact with said distal wall.

2. The syringe assembly of claim 1 wherein said anti-reflux means includes said stopper having an outwardly projecting rib, and said inside surface of said barrel including a recess for receiving said rib when said stopper is in contact with  
20 said distal wall.

3. The syringe assembly of claim 2 wherein said rib is an annular rib and said recess is an annular recess.

25 4. The syringe assembly of claim 1 wherein said anti-reflux means includes a contact area on said inside surface of said barrel at the distal end of said barrel, said contact area having a higher coefficient of friction than said inside surface outside of said contact area for engaging said stopper when said stopper is in contact with said distal wall of said barrel.

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5. The syringe assembly of claim 4 wherein said contact area includes a plurality of annular deformations.

6. The syringe of claim 5 wherein said annular deformations are annular projections on said inside surface of said barrel.

5 7. The syringe assembly of claim 1 including flush solution in said chamber.

8. The syringe assembly of claim 7 further including a tip cap releasably connected to said tip of said syringe barrel for sealing said passageway.

10 9. The syringe assembly of claim 7 wherein said flush solution is selected from the group consisting of saline flush solution and heparin lock flush solution.

10. The syringe assembly of claim 1 further comprising a needle assembly including a cannula having a proximal end, a distal end and a lumen  
15 therethrough, and a hub having an open proximal end containing a cavity and a distal end attached to said proximal end of said cannula so that said lumen is in fluid communication with said cavity, said needle assembly being removably attached to said tip of said barrel through engagement of said tip to said cavity so that said lumen is in fluid communication with said chamber.

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11. The syringe assembly of claim 1 wherein said stopper is made from material selected from the group consisting of thermoplastic elastomers, natural rubber, synthetic rubber and combinations thereof.

25 12. An I.V. flush syringe assembly comprising:

a barrel having an inside surface defining a chamber for retaining fluid, an open proximal end and a distal end including a distal wall with an elongate tip extending distally therefrom having a passageway therethrough in fluid communication with said chamber;

30 a plunger including an elongate body portion having a proximal end, a distal end and a flexible stopper slidably positioned in fluid-tight engagement with said inside surface of said barrel for drawing fluid into and driving fluid out of said

chamber by movement of said stopper relative to said barrel, said elongate body portion extending outwardly from said open proximal end of said barrel;

a tip cap releasably connected to said tip of said syringe barrel for sealing said passageway;

5 a quantity of flush solution in said chamber between said stopper and said distal wall; and

anti-reflux means for holding said stopper in a partially deflected position when fluid has been delivered from said chamber and said stopper is in contact with said distal wall.

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13. The syringe assembly of claim 12 wherein said anti-reflux means includes said stopper having an outwardly projecting rib and said inside surface of said barrel including a recess for receiving said rib when said stopper is in contact with said distal wall.

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14. The syringe assembly of claim 12 wherein said anti-reflux means includes a contact area on said inside surface of said barrel at the distal end of said barrel, said contact area having a higher coefficient of friction than said inside surface outside of said contact area for engaging said stopper when said stopper is in  
20 contact with said distal wall of said barrel.

15. The syringe assembly of claim 12 wherein said flush solution is selected from the group consisting of saline flush solution and heparin lock flush solution..

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16. A method of flushing a catheter comprising the steps of:

(a) providing a syringe assembly including a barrel having an inside surface defining a chamber for retaining fluid, an open proximal end and a distal end including a distal wall with an elongate tip extending distally therefrom having a passageway therethrough in fluid communication with said chamber, a plunger  
30 including an elongate body portion having a proximal end, a distal end, and a flexible stopper slidably positioned in fluid-tight engagement with said inside surface of said barrel for drawing fluid into and driving fluid out of said chamber

by movement of said stopper relative to said barrel, said elongate body portion extending outwardly from said open proximal end of said barrel, a quantity of flush solution in said chamber, and anti-reflux means for holding said stopper in a partially deflected position when said flush solution has been delivered from said chamber and said stopper is in contact with said distal wall;

(b) providing a catheter having a proximal end, a distal end and a passageway therethrough and a housing having a hollow interior connected to said catheter and in fluid communication with said passageway, said housing having an access valve for allowing fluid communication with said hollow interior;

(c) placing said distal end of said catheter in a blood vessel;

(d) engaging said elongate tip of said barrel with said access valve so that said passageway of said syringe barrel is in fluid communication with said hollow interior of said housing;

(e) applying force to said plunger to move said stopper in a distal direction with respect to said barrel so that said flush solution in said chamber flows through said passageway into said hollow chamber of said housing and through said passageway of said catheter;

(f) continue applying force to the plunger until said stopper contacts and presses against said distal wall of said barrel.

17. A method of flushing a catheter comprising the steps of:

(a) providing a syringe assembly including a barrel having an inside surface defining a chamber for retaining fluid, an open proximal end and a distal end including a distal wall with an elongate tip extending distally therefrom having a passageway therethrough in fluid communication with said chamber, a plunger including an elongate body portion having a proximal end, a distal end, and a flexible stopper slidably positioned in fluid-tight engagement with said inside surface of said barrel for drawing fluid into and driving fluid out of said chamber by movement of the stopper relative to said barrel, said elongate body portion extending outwardly from said open proximal end of said barrel, a quantity of flush solution in said chamber, a needle assembly including a cannula having a proximal end, a distal end and a lumen therethrough and a hub having an open

proximal end containing a cavity and a distal end attached to said proximal end of said cannula so that said lumen is in fluid communication with said cavity, said needle assembly being attached to said tip of said barrel so that said lumen is in fluid communication with said chamber, and anti-reflux means for holding said stopper in a partially deflected position when said flush solution has been delivered from said chamber and said stopper is in contact with said distal wall;

(b) providing a catheter having a proximal end, a distal end and a passageway therethrough and a housing having a hollow interior connected to said catheter and in fluid communication with said passageway, said housing having a septum for allowing fluid communication with said hollow interior;

(c) placing said distal end of said catheter in a blood vessel;

(d) forcing said distal end of said needle through said septum so that said lumen is in fluid communication with said hollow interior of said housing;

(e) applying force to said plunger to move said plunger in a distal direction with respect to said barrel so that said flush solution in said chamber flows through said passageway into said hollow chamber of said housing and through said passageway of said catheter;

(f) continue applying force to the plunger until said stopper contacts and presses against said distal wall of said barrel.